EXD.

(Bulletins 354 to 357 constitute the Report for 1930. In binding, pages i-xiii at the end of this bulletin should be detached and placed before Bulletin 354 which begins with page 1.)

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ORONO

BULLETIN 357 DECEMBER, 1930

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MAINE
AGRICULTURAL EXPERIMENT STATION
ORONO, MAINE

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BULLETIN 357

ABSTRACTS OF PAPERS PUBLISHED BY THE STATION IN 1930 BUT NOT INCLUDED IN THE BULLETINS

A complete list of all the publications issued by and from the Station in 1930 is given on pages xi-xii of the introduction of this Report. The following pages contain abstracts of the papers issued during the year that are not included in the Bulletins or Official Inspections.

TARSAL CLAWS OF NOCTUID LARVAE*

Because of difficulty experienced in the classification of larvae of the family Noctuidae, which includes the cutworms, a study of tarsal claws was made of several species with a view to their use as taxonomic characters. It was found that they have a taxonomic value in separating some of the closely related species. For convenience of application to taxonomic problems, a method of comparison of the claws of several species is described and a table of ratios between parts of tarsal claws is included.

WIREWORM CONTROL IN MAINE†

The wheat wireworm, *Agriotes mancus* Say, is a serious pest to Maine crops. An upland species of the genus *Melanotus* is second in importance. Certain cultural practices and immune crops have been found to be effective in checking wireworm infestations. Meadows and oat fields seem to be favorite breeding grounds for the wheat wireworm. Clover, buckwheat, and peas are resistant to the attacks of these insects and potatoes are very susceptible. Fertilizer is useful in strengthening plants to withstand wireworm attacks. Drainage is helpful in controlling the wheat wireworm and fall plowing is but partially effective.

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*This is an abstract of a paper by J. H. Hawkins, having the same title and published in the Annals of the Entomological Society of America 23: 393-396. 1930.

†This is an abstract of a paper by J. H. Hawkins, having the same title and published in the Journal of Economic Entomology 23:349-352. 1930.

COLOR OF POTATO CHIPS AS INFLUENCED BY STORAGE TEMPERATURES OF THE TUBERS AND OTHER FACTORS*

By employing the standard Munsell color disks it was found possible to measure the color of potato chips as a scale for comparison.

When potatoes of three varieties were held in commercial cold storage two weeks or more all produced chips very much darker than those made from tubers of the same lot cooked at the beginning of the experiment or held in storage at 40° to 55° F. If the potatoes which had been in cold storage were held at room temperature, the frying color became lighter. This change in color is correlated with change in sugar content under these different conditions of storage, darker color indicating more sugar.

Potatoes dug at an early date, so that they were somewhat immature, gave chips darker than those from mature tubers. Size of tubers was not significantly related to chip color in the more mature lots.

Individual tubers from the same tuber line or from the same hill did not respond in an identical manner to those differences in storage temperatures. Averages were similar to those in other lots receiving comparable treatment.

Tubers from plants showing signs of the diseases spindle tuber, leaf roll, mild mosaic, and giant hill responded to cold storage like the healthy stocks already discussed. Tubers from plants with rugose mosaic were an exception and did not show much change.

A survey of trade preferences showed that very light chips are desired. Northern-grown potatoes may be unsuitable for this purpose when they are brought in from the field. (See lot 1, Tables 2 and 3).

---

*This is an abstract of a paper by Marion D. Sweetman, having the same title and published in the Journal of Agricultural Research 41:479-489. 1930.

EFFECT OF SEED-POTATO TREATMENT ON YIELD AND RHIZOCTONIA IN NORTHEASTERN MAINE FROM 1925 TO 1928*

During each of the four years, 1925 to 1928 inclusive, from 12 to 18 different methods of treating Irish Cobbler seed potatoes were compared on Aroostook Farm. Care was taken to make conditions similar for all parts of the experiment except the conditions under test. To check on this, the results were analyzed according to standard mathematical formulae.

Seed treatment with most of the tested materials reduced seed-piece decay, improved the stand, increased the vigor, inhibited infection by Rhizoctonia, and increased the yield. The treatments have, however, varied in their results from one season to another, giving sometimes significant and sometimes non-significant differences. Undesirable results, such as seed-piece injury and yield reduction, have occurred. Seed treatment may not always be beneficial and profitable, especially on seed tubers free from Rhizoctonia sclerotia.

Cold corrosive sublimate and hot corrosive sublimate were among the most effective treatments against Rhizoctonia. Formaldehyde was less effective than corrosive sublimate. Hot formaldehyde controlled Rhizoctonia as well as cold formaldehyde. In general the newer organic-mercury compounds have not controlled Rhizoctonia as well as has corrosive sublimate. Seed bearing many Rhizoctonia sclerotia (black scurf) often produced crops with not enough sclerotia present to affect the appearance greatly. However, clean seed at other times was preferable in this respect to diseased seed, and disinfected diseased seed preferable to untreated.

The yields secured by the use of the newer organic-mercury compounds compared favorably with those obtained with the old standard corrosive sublimate and formaldehyde treatments.

One of the most important benefits derived from treating seed stock was the reduction of seed-piece decay and the consequent increase of stand in certain seasons.

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*This is an abstract of a paper by E. S. Schultz, L. O. Gratz, and Reiner Bonde, having the same title and published in Phytopathology 20: 47-64. 1930.

Conditions of experiments differ in some ways from conditions of practice. Many conditions exist which can and do cause variation from place to place in one season, and from season to season in one place, in regard to the effects of any kind of seed treatment.

A survey of results from investigations outside of Maine gave general conclusions like those drawn from the results in Maine.

SOME CONDITIONS DETERMINING POTATO SEED-PIECE DECAY AND BLACK LEG INDUCED BY MAGGOTS*

Adult flies of the seed corn maggot (*Hylemyia cilicrura*) did not infect potato seed pieces by direct contact while their eggs produced maggots which induced decay in damp chambers and which also induced rapid decay after entering spots of decay due to various fungi and bacteria. These spots, which served as places of entrance, developed more in storage than in the field, in Maine. Similar activity was observed for seed-potato maggots (*H. trichodactyla*). Negative results were secured with the common house fly *(Musca domestica),* false crane flies *(Trichocera* sp.), a fungus gnat *(Sciara tribentata),* and various species of *Drosophila.* From inside the puparia of the seed corn maggot have been isolated *Bacillus phytophthorus* (a cause of blackleg) and some other bacteria that are pathogenic to potatoes.

THE CABBAGE MAGGOT AS A DISSEMINATING AGENT OF BACTERIAL ROTS IN THE CRUCIFERAE*

No turnips were with rot unless there was maggot injury, and in them all maggot (*Hylemyia brassicae*) injury was accompanied by a soft white rot either in field or storage. In chinese

*This is an abstract of a paper by Reiner Bonde having the same title and published as an abstract in Phytopathology 20:128. 1930.

*This is an abstract of a paper by Reiner Bonde having the same title and published as an abstract in Phytopathology 20:128. 1930.

cabbage, maggot injury was followed by a rapid soft rot. In rutabagas, only near maggot trails were bacteria found which were pathogenic on turnip, cabbage, and potato. In wild mustard (*Brassica arvensis*) and wild radish (*Raphanus raphanistrum*), only near maggot trails were pathogenic bacteria found. From wild radish roots, maggots were secured which induced bacterial decay in turnip and kohlrabi, but not in potato. Pathogenic bacteria were obtained from inside of puparia and mature flies. The pathogenic bacteria appear to include *Bacillus carotovorus, B. phytophthorus,* and *Bacterium campestre.*

NET NECROSIS VERSUS STEM-END BROWNING IN AROOSTOOK POTATOES*

In the winter of 1929-30, discoloration inside of Aroostook potato tubers caused complaints, and was found to be of two types. One type was net necrosis, due to the leafroll disease, and typically extending from the stem-end scar as brownish strands for an inch or more in several zones or circles. The other type was stem-end browning with the cause unknown, usually not extending into the tuber as far, or in as many zones, as net necrosis. In the spring, of tubers planted as having net necrosis, 99 per cent produced plants with leafroll, while of tubers with stem-end browning of unknown cause, only 6 per cent produced leafroll plants, or about the same as tubers with no discoloration. Even if the cause of internal discoloration can not be determined with certainty in some tubers, it should be possible to determine the cause or causes of internal discoloration in any potato seed stock during the second half of the winter storage period, and discrimination should not be made against stocks only with the stem-end browning, as far as is known at present. The stem-end browning seems to be seasonal in any one region, regional in any one season, and more common than net necrosis in Aroostook potatoes. Leafroll only rarely causes net necrosis in Irish Cobblers and Spauldings (Rose 4), and in Green Mountains does so only in some of the tubers produced by plants growing from

*This is an abstract of a paper by Donald Folsom having the same title and published in Amer. Potato Jour. 7:251-256. 1930.

healthy seed and infected with the disease during the growing season, and after some months or weeks in storage.

METEOROLOGICAL OBSERVATIONS

For many years the meteorological records were made at the Experiment Station by members of the Station staff. This work was transferred to the Department of Physics of the University of Maine on June 1, 1911. The Station is indebted to the Department of Physics for the meteorological summary for 1930 which appears on the following page.

The instruments used are located on the University campus at Lat. 44° 54′ 2″ N., Lon. 64° 40′ 5″ W. Elevation 135 feet. They are the same as those used in preceding years and include: Maximum and minimum thermometers, rain gauge, self-recording anemometer, vane, and barometers. The observations at Orono now form an almost unbroken record of sixty-two years.

METEOROLOGICAL SUMMARY FOR 1930

1930	January	February	March	April	May	June	July	August	September	October	November	December	Average	Total
Highest temperature	50	55	51	70	88	94	89	89	85	90	64	53	-------	-------
Lowest temperature	–14	–18	1	15	31	39	45	44	35	25	8	–7	-------	-------
Mean temperature	20.85	21.60	32.23	42.50	56.88	68.44	67.85	66.04	62.30	50.17	39.20	24.95	46.17	-------
Mean temperature in 62 years	16.14	18.90	30.10	39.00	50.49	61.22	66.09	65.69	59.20	49.26	37.49	23.04	43.05	-------
Total precipitation in inches	3.83	1.75	5.78	1.47	3.19	1.97	3.02	1.77	2.30	2.76	2.20	3.14	-------	33.18
Mean total precipitation in 62 years	2.76	3.40	3.82	2.96	3.39	3.39	3.32	2.40	3.36	3.82	3.31	3.57	-------	39.50
Number of days with .01 inch precipitation or more	12	10	8	4	9	11	10	9	6	8	5	8	-------	100
Snowfall in inches	18.3	12.5	3.5	0.5	-------	-------	-------	-------	-------	-------	-------	21.3	-------	56.1
Mean snowfall in 62 years	21.59	21.59	14.13	5.67	-------	-------	-------	-------	-------	0.75	6.13	16.11	-------	85.97
Number of clear days	15	16	19	20	19	18	19	13	19	17	20	8	-------	203
Number of partly cloudy days	6	4	7	6	7	6	9	13	7	8	5	18	-------	96
Number of cloudy days	10	8	5	4	5	6	3	5	4	6	5	5	-------	66
Average wind velocity in miles per hour	4.17	4.78	6.98	6.24	5.42	4.96	3.72	3.99	4.27	4.29	3.52	3.19	4.63	-------

REPORT OF THE TREASURER

The Station is a department of the University and its accounts are kept in the office of the Treasurer of the University. The books, voucher files, etc., are, however, all distinct from those of the other departments of the University. The classification of accounts is that prescribed by the auditors on the part of the Federal Government, and approved by the State Auditor. All of the accounts are audited by the State Auditor, and the Hatch Fund, Adams Fund, and Purnell Fund accounts are also audited by the Office of Experiment Stations acting for the United States Secretary of Agriculture in accordance with federal law.

The income of the Station from federal and state appropriations for the year that ended June 30, 1930, was:

U. S. Government, Hatch Fund	$15,000.00
U. S. Government, Adams Fund	15,000.00
U. S. Government, Purnell Fund	60,000.00
State of Maine, Animal Husbandry investigations	5,000.00
State of Maine, Aroostook Farm investigations	5,000.00
State of Maine, Highmoor Farm investigations	5,000.00
State of Maine, General Maintenance	20,000.00

The cost of maintaining the laboratories for the inspection analyses is borne by analysis fees and by the State Department of Agriculture. The income from sales at the experimental farms and the poultry plant is used for the expense of investigations. The printing is paid for by an appropriation to the University.

At Aroostook Farm there are in connection with the cooperative work with the Federal Department of Agriculture certain expenditures for the Department made from sales of crops from Department investigations that do not appear in the tabular statements. They are carried as distinct and separate accounts, always with credit balances on the Station ledger.

REPORT OF THE TREASURER FOR YEAR ENDING JUNE 30, 1930

DISBURSEMENTS

	Hatch Fund	Adams Fund	Purnell Fund	State Maintenance
Salaries	$ 9,108.00	$15,000.00	$40,349.10	$ 3,984.97
Labor	2,155.98		1,467.94	5,763.76
Stationery and Office Supplies	72.14		352.04	288.07
Scientific Supplies			655.52	221.83
Feeding Stuffs	1,745.49		1,315.21	1,464.92
Sundry Supplies	140.13		1,039.61	1,228.34
Fertilizers			260.15	1,810.10
Communication Service	140.15		48.27	178.56
Travel Expenses			6,166.28	348.17
Transportation of Things	55.80		280.73	158.51
Publications	121.20		64.39	21.26
Heat, Light, Water and Power	920.05		49.95	509.64
Furniture, Furnishings and Fixtures	100.28		1,713.63	246.05
Library	394.74		123.55	425.24
Scientific Equipment	9.10		3,744.26	120.78
Live Stock				500.00
Tools, Machinery and Appliances	34.27		1,765.02	1,574.49
Buildings and Land	2.67		214.74	908.53
Contingent Expenses			389.61	246.78
Total	$15,000.00	$15,000.00	$60,000.00	$20,000.00

REPORT OF THE TREASURER FOR YEAR ENDING JUNE 30, 1930

DISBURSEMENTS

	Aroostook Farm	Highmoor Farm	Animal Husbandry	General Account	Inspection Analyses
Salaries	$1,600.00	$2,000.00	$	$	$10,077.00
Labor	3,866.09	2,562.32	2,458.01	886.55	147.00
Stationery and Office Supplies	1.00		9.50	8.93	59.57
Scientific Supplies				32.38	273.54
Feeding Stuffs	210.25	.60	4,150.02	10.50	
Sundry Supplies	491.31	661.03	199.94	3.18	79.89
Fertilizers					
Communication Service	14.10	49.81		7.80	59.74
Travel Expenses				479.92	
Transportation of Things	29.05	145.63	159.03	7.15	149.00
Publications		1.50			
Heat, Light, Water and Power	349.27	153.70	762.89	36.61	477.78
Furniture, Furnishings and Fixtures	10.80	59.05			19.18
Library				142.86	8.00
Scientific Equipment				1,467.56	88.16
Live Stock	250.00	15.00			
Tools, Machinery and Appliances	1,520.99	381.34	106.22	690.40	2.25
Buildings and Land	350.48	36.18	15.72	61.99	4.51
Contingent Expenses	378.26	14.24	140.00	19.52	15.00
Total	$9,071.60*	$6,080.40†	$8,001.33‡	$3,855.35	$11,460.62

*$4,071.60 from sales fund.
†$1,080.40 from sales fund.
‡$3,001.33 from sales fund.

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